



US006251478B1

(12) **United States Patent**
Pacifico et al.

(10) **Patent No.: US 6,251,478 B1**
(45) **Date of Patent: Jun. 26, 2001**

(54) **SENSITIVE SUBSTANCE ENCAPSULATION**

(75) **Inventors:** Carl J. Pacifico, West Milford, NJ
(US); Wen-Hsin Wu, Middletown;
Marta Fraley, Parksville, both of NY
(US)

(73) **Assignee:** Balchem Corporation, Slate Hill, NY
(US)

(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 09/469,368

(22) **Filed:** Dec. 22, 1999

(51) **Int. Cl.⁷** B01J 13/02; A61K 9/16;
B65B 1/04

(52) **U.S. Cl.** 427/213.3; 424/1.29; 424/1.69;
424/1.73; 424/451; 424/463; 424/490; 424/491;
424/493; 424/496; 426/89; 426/96; 426/98;
426/100; 426/235

(58) **Field of Search** 424/1.29, 1.69,
424/1.73, 451, 463, 490, 491, 493, 496;
427/213.3; 426/89, 96, 98, 100, 235

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,857,964 12/1974 Yolles .
4,232,047 * 11/1980 Sair et al. 426/96

4,532,145 7/1985 Saleeb et al. .
4,576,737 3/1986 Johnson .
4,576,826 3/1986 Liu et al. .
4,689,235 * 8/1987 Barnes et al. 426/89
4,828,857 5/1989 Sharma et al. .
5,004,595 4/1991 Cherukuri et al. .
5,009,900 * 4/1991 Levine et al. 426/96
5,399,368 3/1995 Garwood et al. .
5,460,756 10/1995 Redding, Jr. .
5,496,574 3/1996 Rushmore et al. .
5,506,353 4/1996 Subramaniam .
5,558,889 9/1996 Rossi .
5,580,593 12/1996 Liu et al. .
5,601,865 2/1997 Fulger et al. .
5,603,971 2/1997 Porzio et al. .
5,607,708 3/1997 Fraser et al. .
5,705,207 1/1998 Cook et al. .
5,756,136 5/1998 Black et al. .
5,792,505 8/1998 Fulger et al. .
5,874,102 2/1999 LaJoie et al. .

* cited by examiner

Primary Examiner—Samuel A. Acquah

(74) *Attorney, Agent, or Firm*—Banner & Witcoff, Ltd.

(57) **ABSTRACT**

A process for stabilizing a sensitive substance; (a) plating a sensitive substance onto a solid carrier under a controlled atmosphere to reduce loss of the sensitive substance; (b) encapsulating the plated material under controlled atmosphere and airflow to reduce volatilization during the process and stabilize the sensitive substance.

20 Claims, No Drawings